REMARKS

Claims 1-6, 11-24, and 29 are pending in this application. By this Amendment, claims 1, 11, 22, and 29 have been amended and claims 7-10 and 25-28 have been canceled without prejudice to, or disclaimer of subject matter found therein or the right to file a divisional application. No new matter has been added.

On page 3 of the Office Action, claims 1, 4, 11-13, 15, 17, 18 and 29 were rejected under 35 U.S.C. §103(a) over Tsuchiya et al. (Tsuchiya), U.S. Patent No. 4,841,182 in view of Abadia et al. (Abadia), U.S. Patent No. 5,883,450 and Irie et al. (Irie), U.S. Patent No. 5,710,467. The rejection is respectfully traversed.

Applicants' invention of claim 1 calls for an alternator for use in an automotive vehicle, the alternator comprising a housing including a front frame and a rear frame; a cylindrical stator including an armature coil, the cylindrical stator being contained in the housing; a rotor rotatably disposed inside the cylindrical stator and supported in the housing; a rectifier mounted on the rear frame; a rear cover covering the rectifier, the rear cover being fixed to the housing; and a cooling fan for introducing cooling air into the housing through air inlets formed on a rear surface of the rear frame for cooling the rectifier, the cooling fan being connected to the rotor, wherein the rectifier includes a minus heatsink plate on which minus rectifier elements are mounted and a plus heatsink plate on which plus rectifier elements are mounted, the minus heatsink plate being disposed to face the rear surface of the rear frame forming an air passage therebetween, the plus heatsink plate being disposed to face the rear cover, the minus heatsink plate and the plus heatsink plate forming a two-story structure in an axial direction; a lead terminal led out of each minus rectifier element extends in the axial direction of the rotor toward the rear cover; the minus heatsink plate includes cooling fins extending in the axial direction and forming radial air passages between the cooling fins; and the rear cover includes a plurality of radial openings that are open in a radial direction of the

rotor and positioned radially outside of the cooling fins, so that the cooling air is introduced from the radial openings upon rotation of the cooling fan and flows through the radial air passages between the cooling fins and through the air passage between the minus heatsink plate and the rear surface of the rear frame. The alleged combination of Tsuchiya, Abadia, and Irie fails to disclose or suggest these features.

Applicants' invention of claim 11 calls for an alternator for use in an automotive vehicle, the alternator comprising a housing including a front frame and a rear frame; a cylindrical stator including an armature coil, the cylindrical stator being contained in the housing; a rotor rotatably disposed inside the cylindrical stator and supported in the housing; a rectifier mounted on the rear frame; a rear cover covering the rectifier, the rear cover being fixed to the housing; and a cooling fan for introducing cooling air into the housing through air inlets formed on a rear surface of the rear frame for cooling the rectifier, the cooling fan being connected to the rotor, wherein the rectifier includes a minus heatsink plate on which minus rectifier elements are mounted and a plus heatsink plate on which plus rectifier elements are mounted, the minus heatsink plate being disposed to face the rear surface of the rear frame, the plus heatsink plate being disposed to face the rear cover, the minus heatsink plate and the plus heatsink plate forming a two-story structure in an axial direction; a lead terminal led out of each minus rectifier element extends in the axial direction of the rotor toward the rear cover; the minus heatsink plate includes cooling fins standing therefrom toward the rear cover in the axial direction and forming radial air passages between the cooling fins; the minus heatsink plate further includes second cooling fins standing therefrom toward the rear frame in the axial direction and forming second radial air passages between the second cooling fins; and the rear cover includes a plurality of radial openings that are open in a radial direction of the rotor and positioned radially outside of the cooling fins, so that the cooling air is introduced from the radial openings upon rotation of the cooling fan and flows through the

radial air passages between the cooling fins and through the second radial air passages between the second cooling fins. The alleged combination of Tsuchiya, Abadia, and Irie fails to disclose or suggest these features.

Applicants' invention of claim 29 calls for an alternator for use in an automotive vehicle, the alternator comprising a housing including a front frame and a rear frame; a cylindrical stator including an armature coil, the cylindrical stator being contained in the housing; a rotor rotatably disposed inside the cylindrical stator and supported in the housing; a rectifier mounted on the rear frame; a rear cover covering the rectifier, the rear cover being fixed to the housing; and a cooling fan for introducing cooling air into the housing through air inlets formed on a rear surface of the rear frame for cooling the rectifier, the cooling fan being connected to the rotor, wherein the rectifier includes a minus heatsink plate on which minus rectifier elements are mounted and a plus heatsink plate on which plus rectifier elements are mounted, the minus heatsink plate being disposed to face the rear surface of the rear frame, the plus heatsink plate being disposed to face the rear cover, the minus heatsink plate and the plus heatsink plate forming a two-story structure in an axial direction; a lead terminal led out of each minus rectifier element extends in the axial direction of the rotor toward the rear cover; the rear cover includes radial openings that are open in a radial direction of the rotor and axial openings that are open in the axial direction of the rotor; and the minus heatsink plate includes at least first cooling fins standing from the minus heatsink plate toward a rear side of the alternator in the axial direction or second cooling fins standing from the minus heatsink plate toward a front side of the alternator in the axial direction, the first and the second cooling fins are positioned to face the radial openings of the rear cover, and the radial openings of the rear cover positioned radially outside of the first and second cooling fins. The alleged combination of Tsuchiya, Abadia, and Irie fails to disclose or suggest these features.

As the Examiner admits on pages 4 and 5 of the Office Action, Tsuchiya fails to disclose the bracket structure, as recited in claims 1, 11, and 29. Accordingly, Tsuchiya does not disclose or suggest a lead terminal led out of each minus rectifier element extends in an axial direction of the rotor toward the rear cover and the rear cover includes a plurality of radial openings that are opened in a radial direction of the rotor, so that the cooling air is introduced from the radial openings upon rotation of the cooling fan and flows through the radial air passages between the cooling fins and through the air passage between the minus heatsink plate and the rear surface of the rear frame, as recited in claims 1, 11, and similarly, as recited in claim 22 and the rear cover includes radial openings that are opened in a radial direction of the rotor and axial openings that are opened in the axial direction of the rotor, as recited in claim 29.

Tsuchiya also fails to disclose or suggest that the minus heatsink plate and the plus heatsink plate form a two-story structure in an axial direction, as recited in claims 1, 11, 22, and 29. Further, Tsuchiya fails to disclose or suggest that the radial openings are positioned radially outside of the cooling fins, as recited in claims 1, 22, and 11 or the radial openings of the rear cover are positioned radially outside of the first and second cooling fins, as recited in claim 29.

In addition, contrary to the Office Action's assertion, Tsuchiya fails to disclose or suggest a cooling fan for introducing cooling air into the housing through air inlets formed on a rear surface of the rear frame for cooling the rectifier, the cooling fan being connected to the rotor, wherein the rectifier includes a minus heatsink plate, on which minus rectifier elements are mounted and a plus heatsink plate on which plus rectifier elements are mounted, the minus heatsink plate being disposed to face the rear surface of the rear frame forming an air passage therebetween, the plus heatsink plate being disposed to face the rear cover, as recited in claims 1, 11, 22, and 29.

First, Tsuchiya does not disclose or suggest where the air intake ports (air inlets) are located on the generator 1. Tsuchiya only generally describes that the rectifier 10 is placed in air pathway in which air for cooling the radiators is introduced into the inside of generator 1 from the outside of the generator 1 through air intake ports (not shown) formed in the case brackets 1a, 1b (col. 4, lines 4-8). The brackets 1a, 1b are the two-halves that form the generator 1 (Fig. 1). But where exactly are the air intake ports located on the case brackets 1a, 1b is not known because Tsuchiya does not shown it. The air intake ports could be located anywhere. Accordingly, one skilled in the art would not know the location of the air intake ports because these air intake ports are not shown in Tsuchiya's disclosure.

Second, Tsuchiya's rectifier does not correspond to Applicants' rectifier, as recited in claims 1, 11, 22, and 29. In Tsuchiya, both the positive-side radiator 15 and negative-side radiator 16 are positioned at the same level in the axial direction (Figs. 1-3). But, radiators 15, 16 do not form a two-story structure in an axial direction. Unlike a two-story structure, which is difficult to cool by cooling air blown from the axial direction, it is not necessary to cool the minus heatsink plate of Tsuchiya with additional cooling air from radial openings provided in the rear cover because radiators 15, 16 are not a two-story structure. Thus, Tsuchiya does not use radial openings in the rear cover to cool the minus heatsink plate. Further, the positive-side radiator 15 of Tsuchiya is not disposed to face the rear cover (Figs. 1 and 2).

As Tsuchiya describes, the radiators 15, 16 are positive-side and negative-side radiators, respectfully, and range in superposed relation one over another (col. 4, lines 20-24). Both ends of each radiator 15 or 16 are engaged with the bolts 13, 13', respectfully, with the radiators 15, 16 being insulated from each other by insulator 17 interposed therebetween (col. 4, lines 20-27). The positive-side radiator 15 is placed closer to the axis of the rotor cord 3, and the negative-side radiator 16 is positioned radially outward of or on the outer side

of radiator 15, i.e., on the side more remote than the radiator 15 from the axis of the core shaft 2 (col. 4, lines 32-36). The radiators 15, 16 are arranged in parallel relation to each other, and they are positioned parallel to the direction of the air pathway or airflow such that the insulating substrate 14 is positioned downstream of the air course (col. 4, lines 36-40).

Accordingly, Tsuchiya's rectifier does not correspond to Applicants' rectifier because Tsuchiya fails to disclose or suggest that the plus heatsink plate is disposed to face the rear cover, and the minus heatsink plate and the plus heatsink plate form a two-story structure in an axial direction, as recited in claims 1, 11, 22, and 29.

Third, Tsuchiya makes it clear that the cooling fins 15a, 16a project toward the cooling fan 3a (col. 5, lines 47-49). As Tsuchiya describes, the cooling fin 16a projects from four surfaces of the radiator 16, that is, on the front and rear surfaces of the radiator 16 seen in the direction along the axis of the core shaft 2 (or along the air pathway), and on the inner and outer surfaces of the radiator 16 seen from the side of the core shaft (the side surface of the radiator 16 facing the radiator 15 is the inner surface of the radiator 16 (col. 5, lines 6-13).

Accordingly, Tsuchiya fails to disclose or suggest the minus heatsink plate includes cooling fins extending in the axial direction and forming radial air passages between the cooling fins, as recited in claims 1, 11, and similarly, as recited in claim 22. Also, for the reasons discussed above, Tsuchiya fails to disclose or suggest that the minus heatsink plate includes at least first cooling fins standing from the minus heatsink plate toward a rear side of the alternator in the axial direction, or second cooling fins standing from the minus heatsink plate toward a front side of the alternator in the axial direction, the first and second cooling fins are positioned to face the radial openings of the rear cover, and the radial openings of the rear cover positioned radially outside of the first and second cooling fins, as recited in claim 29.

In Abadia, there are no cooling fins formed on the minus heatsink plate. As shown in Fig. 1, each diode D5, D6 is formed of a generally cylindrical body and is designed to be fixed as a force-fit in an opening having the same diameter formed either in the back half-shell 10 (for the negative side diodes) or else in the positive dissipating support 60 (for the positive side diodes). (Col. 3, lines 22-27). A lead Q extends from each diode axially therefrom (col. 3, lines 28-31). This configuration of the lead Q from the diodes as seen in Fig. 1 is so that the leads Q of the two diodes D5, D6 in a given pair are connected together by a conductor 35 that forms a portion of the connector 30 (col. 4, lines 1-3). As Abadia explains, the disposition of positive side diode D6 and negative side diode D5 makes it possible to reduce the overall axial length of the alternator insofar as a portion of the actual length required for the positive side diodes is taken from the alternator body itself (col. 3, lines 55-60). It is a portion of the positive side diode D6 that penetrates into the air-passing opening 14 that is formed in the half-shell 10 in order to reduce the overall actual length of the alternator (Fig. 1). The half-shell 10 in which the negative side diodes are press-fitted form the rear frame of the alternator (Figs. 1-3). The negative side diodes overlie the openings 14 (col. 3, lines 61-62).

However, the back half-shell 10 of the alternator does not include a plurality of radial openings that are open in a radial direction of the rotor and positioned radially outside of the cooling fins, so that the cooling air is introduced from the radial openings upon rotation of the cooling fan and flows through the radial air passages between the cooling fins and through the air passage between the minus heatsink plate and the rear surface of the rear frame because the back half-shell 10 of Abadia is the minus heatsink plate. There is no air passage between the minus heatsink plate and the rear surface of the rear frame.

In Irie, although there is a two-story structure of the heatsink plates (Figs. 2 and 4), however, the negative heatsink plate (i.e., negative side cooling fin 70) is disposed against the

rear cover (i.e., cover 4) of the rear frame 12 (Figs. 1, 2 and 3). Accordingly, there is no air passage between the minus heatsink plate 70 and the rear surface of the rear frame 4 (Figs. 1 and 4). Additionally, Irie's minus heatsink plate (negative side cooling fin) does not include cooling fins extending in the axial direction and forming radial air passages between the cooling fins.

In other words, there are no radial openings formed in the rear cover 4 for introducing cooling air so that the cooling air is introduced from the radial openings upon rotation of the cooling fan and flows through the radial air passages between the cooling fins and through the air passage between the minus heatsink plate and the rear surface of the rear frame, as recited in claims 1, 11, 22, and 29.

As MPEP §2143.03 states, "to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." As discussed above, the alleged combination fails to disclose or suggest all of the features as recited in claims 1, 11, and 29 and similarly, as recited in claim 22. Thus, the alleged combination does not establish a *prima facie* case of obviousness.

Because the alleged combination of Tsuchiya, Abadia, and Irie does not disclose, teach or suggest all of the features recited in claims 1, 11, and 29, the alleged combination cannot possibly anticipate or have rendered obvious the subject matter of claims 1, 11, and 29. Further, at least for the reasons discussed with respect to claims 1 and 11, as well as for the additional features recited, claim 4, which depends from claim 1, is not rendered obvious, and claims 12, 13, 15, 17, and 18, which depend from claim 11, are also not rendered obvious by the alleged combination. Accordingly, withdrawal of the rejection is respectfully requested.

On page 5 of the Office Action, claims 2, 3, 14, and 16 were rejected under 35 U.S.C. §103(a) over the combination of Tsuchiya, Abadia, and Irie, and in view of Adachi et al. (Adachi), U.S. Patent No. 5,682,071. The rejection is respectfully traversed.

Adachi fails to overcome the above-described deficiencies of the combination of Tsuchiya, Abadia and Irie with respect to claims 1 and 11.

Accordingly, none of the applied references nor their combinations thereof disclose, teach or suggest all of the features recited in claims 1 and 11. Thus, the applied references could not have rendered obvious claims 2 and 3, which depend from claim 1, and claims 14 and 16, which depend from claim 11, at least for the reasons discussed with respect to claims 1 and 11, as well as for the additional features recited therein. Thus, withdrawal of the rejection is respectfully requested.

On page 6 of the Office Action, claims 5, 6, and 22-24 were rejected under 35 U.S.C. §103(a) over the combination of Tsuchiya, Abadia, and Irie and in view of DuBois et al. (DuBois), U.S. Patent No. 5,757,096. The rejection is respectfully traversed.

Applicants' invention of claim 22 calls for an alternator for use in an automotive vehicle, the alternator comprising a housing including a front frame and a rear frame; a cylindrical stator including an armature coil, the cylindrical stator being contained in the housing; a rotor rotatably disposed inside the cylindrical stator and supported in the housing; a rectifier mounted on the rear frame; a rear cover covering the rectifier, the rear cover being fixed to the housing; and a cooling fan for introducing cooling air into the housing through air inlets formed on a rear surface of the rear frame for cooling the rectifier, the cooling fan being connected to the rotor, wherein the rectifier includes a minus heatsink plate on which minus rectifier elements are mounted and a plus heatsink plate on which plus rectifier elements are mounted, the minus heatsink plate being disposed to face the rear surface of the rear frame forming an air passage therebetween, the plus heatsink plate being disposed to face the rear

cover, the minus heatsink plate and the plus heatsink plate forming a two-story structure in an axial direction; the rear surface of the rear frame contacts the minus heatsink plate at places where the air passage between the rear frame and the minus heatsink plate is not formed; the air passage between the rear frame and the minus heatsink plate is composed of a plurality of ditches formed on the rear surface of the rear frame, and an end of the minus rectifier elements is exposed to the ditches so that the rectifier elements are cooled by the cooling air flowing through the ditches; a lead terminal led out of each minus rectifier element extends in the axial direction of the rotor toward the rear cover; the minus heatsink plate includes cooling fins extending in the axial direction and forming radial air passages between the cooling fins; and the rear cover includes a plurality of radial openings that are open in a radial direction of the rotor and positioned radially outside of the cooling fins, so that the cooling air is introduced from the radial openings upon rotation of the cooling fan and flows through the radial air passages between the cooling fins and through the air passage between the minus heatsink plate and the rear surface of the rear frame. The alleged combination fails to disclose or suggest these features.

As discussed above, the alleged combination of Tsuchiya, Abadia and Irie fails to disclose or suggest the features as recited in claim 22 for the same reasons as discussed with respect to claims 1, 11, and 29.

DuBois fails to overcome the above-described deficiencies of the combination of Tsuchiya, Abadia and Irie with respect to claims 1 and 22.

Further, DuBois does not disclose or suggest the relationship between a direction of cooling air and the fins.

Accordingly, none of the applied references disclose, teach or suggest all of the features recited in claims 1 and 22. Thus, the applied references could not have rendered obvious claims 5 and 6, which depend from claim 1, and claims 23 and 24, which depend

from claim 22, at least for the reasons discussed with respect to claims 1 and 22, as well as for the additional features recited therein. Thus, withdrawal of the rejection is respectfully requested.

On page 8 of the Office Action, claims 19-21 were rejected under 35 U.S.C. §103(a) over the combination of Tsuchiya, Abadia and Irie, and in view of Cheetham et al. (Cheetham), U.S. Patent No. 3,538,362. The rejection is respectfully traversed.

Cheetham fails to overcome the above-described deficiencies of the combination of Tsuchiya, Abadia and Irie with respect to claim 11.

Accordingly, none of the applied references disclose, teach or suggest all of the feature recited in claim 11. Thus, the applied references could not have rendered obvious claims 19-21, which depend from claim 11, at least for the reasons discussed with respect to claim 11, as well as for the additional features recited therein. Thus, withdrawal of the rejection is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-29 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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